primitive tubules and also fine prolongations of neuroglia substance. The meshes of the dotted substance, as described by other authors, are only the transsected sheaths of the tubules, and the inter-fibrillar substance is hyaloplasm, the true nervous substance filling the tubes.

Lastly the author gives a scheme for the course of an impulse in a reflex action. The impulse starting from the periphery passes by the cell on the posterior root ganglion, and enters one of the branches into which the sensory fibre divides in the cord. These branches of the entering fibre are assumed to be in connection with at least the branches from the two sorts of cells which, according to Golgi's classification, are there present. Nansen gives reasons for thinking that the impulse does not enter the sensory cell of Golgi. The entering branches being, however, connected with the branches of the motor cells, it is assumed that the impulse travels from the sensory network through the lateral branches of the axis cylinder prolongation of the motor cells. At this point two courses are again open to it. It may either pass up into the motor cell or out along the prolongation. Nansen thinks that the latter course may be the one taken. As is plain, this view relieves the cells from any direct connection with such an impulse. The role suggested for the cells thus thrown out of employment is that of nutritive centres.

The investigation represents much careful study, as far as the histology is concerned, though the presentation could have been condensed with advantage. Against the speculations at the end of the paper there is certainly some positive evidence from the peculiar irritability of nerve cells as compared with that of other elements of the nerve centres. On the other hand, the hypothesis needs for its support either the assumption that the tubules or fibrillae form T branches in the neighborhood of the cell, or else that the conduction in the fibrillae or tubules is not isolated; and so far as known, there are no histological facts which favor either of these assumptions.

Das zentrale Nervensystem der Acephalen. B. RAWITZ. Jenaische Zeitschr. für Naturwissenschaft, B. 20 (N. F. B. XIII), H. 2 und 3, 1887, pp. 385–460. 21 Tafeln.

The author studies the nervous system in the Acephala with the main view of getting a better means for classification within the group. The result of his investigation is to place the Ostreacea at the head of the group because of the highly differentiated visceral ganglion which it possesses. On the way the paper touches many points in comparative neurology. Regarding the form of the ganglion cells, R. is a vigorous supporter of the unipolar cells. The connection of this cell with others may be considered to take place through the network into which the single nervous prolongation is considered to break up. Other cells are described which have only protoplasmic prolongations. Cells are figured as uniting with one another by these latter.

The principal prolongation, where it exists, is considered as the homologue of the axis cylinder or Deiters prolongation, and is described as passing toward the centre of the ganglion. In a few cases the prolongation passes on to a nerve, but in the majority it breaks up into a network in the centre of the ganglion, and from this network the fibres arise. The fibres are simply groups of axis cylinders separated by a homogeneous medium and enclosed in a connective tissue sheath. A ganglion consists of several layers of cells surrounding a

central medullary substance. Both cells and central substance contain something resembling myeline. This myeline separates the fine varicose fibres which make up the truly nervous part of the central substance. This latter is considered as the homologue of the white matter in the vertebrates. No structure is found which corresponds with the neuroglia of the vertebrates.

There is a detailed account of the course of the fibres in the ganglia in different forms, and also several generalizations as to the function of cells from their form and arrangement. The reviewer finds the evidence inconclusive on many of the points stated above.

Zur Anatomie des Nervensystems der Gymnophionen. J. WALDSCHMIDT. Jena. Zeitschr. für Naturwissenschaft, Bd. XX, S. 461.

Under Wiedersheim's direction the author has made a study of the brain and cranial nerves in this interesting order of the amphibia, the representatives of which have rudimentary sense organs and no limbs. The olfactory division of the fore-brain is well developed, the cerebral hemispheres not remarkable, the inter-brain very poorly developed, the mid-brain undivided, the hind-brain wanting, and the after-brain moderate. The pineal gland is very rudimentary. Of the cranial nerves down to the tenth, the second is rudimentary, corresponding with the very poorly developed eyes; the fourth and sixth cannot be found, and the eighth, if represented at all, is only present as the merest rudiment, corresponding with the absence of any auditory mechanism. The chief interest centres in the first pair. There are two roots from each olfactory lobe, a ventral and dorsal. The former is best developed. In the opinion of W. the ventral represents the pair usually found in the vertebrates, while the dorsal roots have been secondarily acquired by this order, which is practically reduced to this single special sense of smell. The condition of the parietal eye as indicated by the very rudimentary state of the pineal gland and the absence of any parietal foramen, is also a point of interest.

Do the Nervi Erigentes leave the Spinal Cord in Anterior or Posterior Roots? GASKELL. Proceed. of the Physiological Society, 1887, No. 1, p. 4. The Journal of Physiol. VIII, 1.

Opinion on this point has been divided. The author stimulated the peripheral portions of the sacral nerve roots in six rabbits. The anterior roots of the second and third sacral nerves caused an erection when stimulated. The stimulation of the posterior roots produced no effect. The inference drawn is that vaso-dilator fibres are to be looked for in the anterior nerve roots.

Zur Anatomie des Froschgehirns. M. KOEPPEN. Neurolog. Centralbl. No. 1, 1888.

In Schwalbe's laboratory and under his direction the author has studied the normal anatomy of the frog's brain by Weigert's haematoxylin method and carmine staining. In the preliminary account here presented the principal results are summarized. The vagus, trigeminus, and acusticus all have large ascending roots, which in the case of the vagus and trigeminus are double. The main ascending root for the vagus is in the lateral column, almost the entire column being used in this way, while for the trigeminus it lies in